



SEQUENCE LISTING

<110> Vannuffel, Pascal
Gara, Jean-Luc

<120> GENETIC SEQS.,...METHODS & DEVICES FOR
ID. OF STAPHYLOCOCCI STRAINS

<130> DECLE27.001APC

<140> 09/509,234

<141> 2000-09-25

<150> EP 97870146.4

<151> 1997-09-26

<160> 64

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 1328

<212> DNA

<213> Staphylococcus femA Consensus Sequence

<220>

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<222> (1)... (1328)

<223> n=any nucleotide

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ngannnnnatg ncnnanagnc atttnacnca nannnnngnn nantangann tnaannttgc 120
nnannnnnnn gannncann tagtnggnat naanaanaan nataangang tnattgcngc 180
ntgnntnntn acngcngtnc cngtnatgaa antnttnaan tanttttatt cnaannnggg 240
nccngtnatn gattntnana annnaganc ngtncantnn ttctttaang anttnnnnaa 300
ntatntnaaa nannannntn nnttatant nnnntngan cctanntnn cntatcaata 360
nnnnaatcat gangnggann tnnnngnnaa tgcnggnan gattggntnt tngatnannt 420
nnnnnnnnntn ggntntnanc annnnggntt nnnnannggn ttgancnna tnnnncaaata 480
nngntnnan tcngtnntan atttannnn naaaannncn nanganntnn tnaannnnat 540
ggatngnntn ngnaannnga anacnaaaaa agtnnanaa aatggngtna aagtnnnntt 600
nntnnnnnaa ganganntnc cnatnttng ntcattnatg gangatacnn cnganncnaa 660
ngnnttnnn gatngngang annnttnta ntanaanngn tnnnnnnatt nnaaagannn 720
ngtntngtn ccnntngcnt atatnnant tgatgantan ntnnnnnga tnnannnga 780
nngnnannnn ntnantaaag annnnaana agcnnntnaa ganatngana aangnccnga 840
naanaaaaa gcnnnnaana annnnnnnaa nntnnaaan caantnnnn cnatntcngc 960
aaanntnnan gangnnann nntnnaann nnancatgg aangaattac cnatntcngc 960
ngnntncttn ntatnaatc cntntgaagt ngntntan gcnngtggn cntcnaatnn 1020
ntnnngncan ttngcnggna gntatgcnt ncaatggnn atgattaant atgcnttna 1080
ncatnnnatn nanngtana attntatgg nnttagnggt nantttanng angangcnga 1140
agatngnggn gtntnaant tnaaaaang ntnnnatgc ganntntng antangttgg 1200
ngantnttn aaaccnatna anaancnnt ntannnnnn tatannncan tnaaaaant 1260
nnannnnann nnnnnntann nannnnnnna nnnnannnn nnnnnnatga aatttacaga 1320

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gttaannn

<210> 2
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<212> DNA
<213> Artificial Sequence

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<223> Primer

<221> misc_feature
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<223> Primer

<400> 3
taatgaagtt tacaaaattt

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<223> Primer

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<223> Primer

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atgncnnana gncatttnac ncana

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tgccatatag tcatttacgc

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<210> 7
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tagtnggnat naanaanaan nataangang tnattgc

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gtncngtna tgaaantntt naantanttt tatttc

35

<210> 9
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<221> misc_feature
<222> (1)...(18)
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aatgcngggn angattgg

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43

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<220>
<223> Primer

<400> 11
aaaaagttca aaaaatgg

18

<210> 12
<211> 18
<212> DNA
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<220>
<223> Primer

<400> 12
aaaaagtaca aaaaatgg

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<210> 13
<211> 40
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<220>
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<222> (1)...(40)
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aagangannt nccnatnttn ngntcattna tggangatac

40

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tatatnnant ttgatganta

20

<210> 15
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<223> Primer

<221> misc_feature
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aanganatng anaaangncc nganaaaaa aa

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<210> 16
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<220>
<223> Primer

<400> 16
aaagatattg aaaaacga

18

<210> 17
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<220>
<223> Primer

<400> 17
aaagatattg aaaagagacc

20

<210> 18
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<212> DNA
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<220>
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<400> 18
aaagatatcg agaaagac

18

<210> 19
<211> 18
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<213> Artificial Sequence

<220>
<223> Primer

<400> 19
aaagacatcg acaagcgt

18

<210> 20
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<221> misc_feature
<222> (1)...(22)
<223> n= any nucleotide

<400> 20
ancatggnaa ngaattaccn at

22

<210> 21
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 21
gaacatggta atgaattac

19

<210> 22
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<221> misc_feature

<222> (1)...(32)

<223> n= any nucleotide

<400> 22

aatccntntg aagtngtnta ntangcnggt gg

32

<210> 23

<211> 35

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<221> misc_feature

<222> (1)...(35)

<223> n= any nucleotide

<400> 23

agntatgcnn tncaatggnn natgattaa tatgc

35

<210> 24

<211> 44

<212> DNA

<213> Artificial Sequence

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<223> Primer

<221> misc_feature

<222> (1)...(44)

<223> n= any nucleotide

<400> 24

tttanngang angcngaaga tgnngngn ntnaanttna aaaa

44

<210> 25

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 25

tttactgaag atgctgaaga

20

<210> 26

<211> 20

<212> DNA

<213> Artificial Sequence

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<223> Primer

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<400> 26
gttgngant tnntnaaacc

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<210> 27
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<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 27
gttggtgact ttattaaacc

20

<210> 28
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 28
atgaaattta cagagttaa

19

<210> 29
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 29
acagcagatg acatcatt

18

<210> 30
<211> 20
<212> DNA
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<220>
<223> Primer

<400> 30
taatgaaaga aatgtgctta

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<210> 31
<211> 19
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<220>

<223> Primer

<400> 31

acacaacttc aattagaac

19

<210> 32

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 32

agtattagca aatgcgg

17

<210> 33

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 33

atgcatattt tccgtaa

17

<210> 34

<211> 17

<212> DNA

<213> Artificial Sequence

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<223> Primer

<400> 34

cagcagatga catcatt

17

<210> 35

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 35

catctaaaga tatattaaat gga

23

<210> 36

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 36

agtattagca aatgcgggtc ac

22

<210> 37

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 37

caacacaact tcaattagaa

20

<210> 38

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 38

tggtatcgt gtcacaatcg

20

<210> 39

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 39

ctggaacttg ttgagcagag

20

<210> 40

<211> 1305

<212> DNA

<213> Staphylococcus haemolyticus femA

<220>

<221> CDS

<222> (4)...(1266)

<400> 40

ata atg aag ttt aca aat tta aca gct aca gag ttt ggc aat tat aca 48

Met Lys Phe Thr Asn Leu Thr Ala Thr Glu Phe Gly Asn Tyr Thr

1 5 10 15

gat aag atg cca tat agt cat ttc aca caa atg act gaa aac tat gag 96

Asp Lys Met Pro Tyr Ser His Phe Thr Gln Met Thr Glu Asn Tyr Glu
 20 25 30

atg aaa gtt gca aat aaa aca gaa act cac tta gtt ggt ata aaa aat 144
 Met Lys Val Ala Asn Lys Thr Glu Thr His Leu Val Gly Ile Lys Asn
 35 40 45

aaa gat aat gag gtt att gca gcc tgc atg ttg aca gca gta cca gtc 192
 Lys Asp Asn Glu Val Ile Ala Ala Cys Met Leu Thr Ala Val Pro Val
 50 55 60

atg aaa ttt ttt aag tac ttt tat tct aac cga gga cct gta att gat 240
 Met Lys Phe Phe Lys Tyr Phe Tyr Ser Asn Arg Gly Pro Val Ile Asp
 65 70 75

tat gat aat aga gag ctt gtt cac ttt ttc ttt aat gag tta aca aag 288
 Tyr Asp Asn Arg Glu Leu Val His Phe Phe Phe Asn Glu Leu Thr Lys
 80 85 90 95

tat tta aaa cag cat aat tgt cta tat gtt cga gtt gac cct tat tta 336
 Tyr Leu Lys Gln His Asn Cys Leu Tyr Val Arg Val Asp Pro Tyr Leu
 100 105 110

cca tat caa tat tta aat cat gat ggt gaa att aca ggt aat gct ggt 384
 Pro Tyr Gln Tyr Leu Asn His Asp Gly Glu Ile Thr Gly Asn Ala Gly
 115 120 125

aat gat tgg ttc ttt gat aag atg aag cat ctc gga ttt gaa cat gaa 432
 Asn Asp Trp Phe Phe Asp Lys Met Lys His Leu Gly Phe Glu His Glu
 130 135 140

ggc ttt act aaa ggt ttt gat ccg att aaa caa atc cga tat cat tct 480
 Gly Phe Thr Lys Gly Phe Asp Pro Ile Lys Gln Ile Arg Tyr His Ser
 145 150 155

gtt tta gat tta aaa aat aaa aca tct aaa gat ata tta aat gga atg 528
 Val Leu Asp Leu Lys Asn Lys Thr Ser Lys Asp Ile Leu Asn Gly Met
 160 165 170 175

gat agt cta cgt aaa cgt aat act aaa aaa gtt caa aaa aat ggt gtg 576
 Asp Ser Leu Arg Lys Arg Asn Thr Lys Lys Val Gln Lys Asn Gly Val
 180 185 190

aaa gtt aag ttc tta tca gaa gaa gaa ctt cca atc ttc cgt tca ttt 624
 Lys Val Lys Phe Leu Ser Glu Glu Glu Leu Pro Ile Phe Arg Ser Phe
 195 200 205

atg gaa gat aca acc gaa acg aaa gaa ttc caa gat aga gat gat agt 672
 Met Glu Asp Thr Thr Glu Thr Lys Glu Phe Gln Asp Arg Asp Asp Ser
 210 215 220

ttc tat tat aat cgc tat aga cat ttc aaa gat cac gtg ctt gta cca 720
 Phe Tyr Tyr Asn Arg Tyr Arg His Phe Lys Asp His Val Leu Val Pro
 225 230 235

cta gct tat att aag ttt gat gag tac atc gaa gaa tta caa aat gaa 768
 Leu Ala Tyr Ile Lys Phe Asp Glu Tyr Ile Glu Glu Leu Gln Asn Glu
 240 245 250 255
 cgt gaa act tta aat aaa gat gtt aat aaa gct tta aaa gat att gaa 816
 Arg Glu Thr Leu Asn Lys Asp Val Asn Lys Ala Leu Lys Asp Ile Glu
 260 265 270
 aaa cga cca gac aat aaa aag gca ttt aat aaa aaa gaa aat ctt gaa 864
 Lys Arg Pro Asp Asn Lys Lys Ala Phe Asn Lys Lys Glu Asn Leu Glu
 275 280 285
 aaa caa tta gat gcc aat caa caa aaa tta gac gag gct aaa aaa tta 912
 Lys Gln Leu Asp Ala Asn Gln Gln Lys Leu Asp Glu Ala Lys Lys Leu
 290 295 300
 caa gcc gaa cat ggt aat gaa tta cca att tca gca ggt ttc ttc ttt 960
 Gln Ala Glu His Gly Asn Glu Leu Pro Ile Ser Ala Gly Phe Phe Phe
 305 310 315
 att aat cca ttt gaa gtt gtt tat tat gca ggt gga act tct aat aaa 1008
 Ile Asn Pro Phe Glu Val Val Tyr Tyr Ala Gly Gly Thr Ser Asn Lys
 320 325 330 335
 tat aga cat ttt gca ggc agt tat gct att caa tgg aca atg att aac 1056
 Tyr Arg His Phe Ala Gly Ser Tyr Ala Ile Gln Trp Thr Met Ile Asn
 340 345 350
 tat gca att gat cat ggt att gat aga tac aat ttc tat ggt att agc 1104
 Tyr Ala Ile Asp His Gly Ile Asp Arg Tyr Asn Phe Tyr Gly Ile Ser
 355 360 365
 ggt aat ttt agt gaa gac gct gaa gat gtt gga gtc att aaa ttt aaa 1152
 Gly Asn Phe Ser Glu Asp Ala Glu Asp Val Gly Val Ile Lys Phe Lys
 370 375 380
 aaa ggt ttc aat gca gac gta att gag tat gtt gga gac ttt gtg aaa 1200
 Lys Gly Phe Asn Ala Asp Val Ile Glu Tyr Val Gly Asp Phe Val Lys
 385 390 395
 cct att aac aaa cct ttg tat tca gtg tat aag aca ctc aaa aag att 1248
 Pro Ile Asn Lys Pro Leu Tyr Ser Val Tyr Lys Thr Leu Lys Lys Ile
 400 405 410 415
 aaa aaa aga ttt aat taa agaggggaat agacgaatat gaaatttaca 1296
 Lys Lys Arg Phe Asn *
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 gagttaaac 1305
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 <211> 420
 <212> PRT
 <213> Staphylococcus haemolyticus femA

<400> 41

Met Lys Phe Thr Asn Leu Thr Ala Thr Glu Phe Gly Asn Tyr Thr Asp
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Lys Met Pro Tyr Ser His Phe Thr Gln Met Thr Glu Asn Tyr Glu Met
20 25 30
Lys Val Ala Asn Lys Thr Glu Thr His Leu Val Gly Ile Lys Asn Lys
35 40 45
Asp Asn Glu Val Ile Ala Ala Cys Met Leu Thr Ala Val Pro Val Met
50 55 60
Lys Phe Phe Lys Tyr Phe Tyr Ser Asn Arg Gly Pro Val Ile Asp Tyr
65 70 75 80
Asp Asn Arg Glu Leu Val His Phe Phe Phe Asn Glu Leu Thr Lys Tyr
85 90 95
Leu Lys Gln His Asn Cys Leu Tyr Val Arg Val Asp Pro Tyr Leu Pro
100 105 110
Tyr Gln Tyr Leu Asn His Asp Gly Glu Ile Thr Gly Asn Ala Gly Asn
115 120 125
Asp Trp Phe Phe Asp Lys Met Lys His Leu Gly Phe Glu His Glu Gly
130 135 140
Phe Thr Lys Gly Phe Asp Pro Ile Lys Gln Ile Arg Tyr His Ser Val
145 150 155 160
Leu Asp Leu Lys Asn Lys Thr Ser Lys Asp Ile Leu Asn Gly Met Asp
165 170 175
Ser Leu Arg Lys Arg Asn Thr Lys Lys Val Gln Lys Asn Gly Val Lys
180 185 190
Val Lys Phe Leu Ser Glu Glu Glu Leu Pro Ile Phe Arg Ser Phe Met
195 200 205
Glu Asp Thr Thr Glu Thr Lys Glu Phe Gln Asp Arg Asp Ser Phe
210 215 220
Tyr Tyr Asn Arg Tyr Arg His Phe Lys Asp His Val Leu Val Pro Leu
225 230 235 240
Ala Tyr Ile Lys Phe Asp Glu Tyr Ile Glu Glu Leu Gln Asn Glu Arg
245 250 255
Glu Thr Leu Asn Lys Asp Val Asn Lys Ala Leu Lys Asp Ile Glu Lys
260 265 270
Arg Pro Asp Asn Lys Lys Ala Phe Asn Lys Lys Glu Asn Leu Glu Lys
275 280 285
Gln Leu Asp Ala Asn Gln Gln Lys Leu Asp Glu Ala Lys Lys Leu Gln
290 295 300
Ala Glu His Gly Asn Glu Leu Pro Ile Ser Ala Gly Phe Phe Phe Ile
305 310 315 320
Asn Pro Phe Glu Val Val Tyr Tyr Ala Gly Gly Thr Ser Asn Lys Tyr
325 330 335
Arg His Phe Ala Gly Ser Tyr Ala Ile Gln Trp Thr Met Ile Asn Tyr
340 345 350
Ala Ile Asp His Gly Ile Asp Arg Tyr Asn Phe Tyr Gly Ile Ser Gly
355 360 365
Asn Phe Ser Glu Asp Ala Glu Asp Val Gly Val Ile Lys Phe Lys Lys
370 375 380
Gly Phe Asn Ala Asp Val Ile Glu Tyr Val Gly Asp Phe Val Lys Pro
385 390 395 400
Ile Asn Lys Pro Leu Tyr Ser Val Tyr Lys Thr Leu Lys Lys Ile Lys
405 410 415
Lys Arg Phe Asn
420

<210> 42
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 <212> DNA
 <213> Staphylococcus lugdunensis femA

<220>
 <221> CDS
 <222> (1)...(1242)

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 ttt act caa atg aca ggt aac tat aat tta aaa gtt gcc gaa aaa aca 96
 Phe Thr Gln Met Thr Gly Asn Tyr Asn Leu Lys Val Ala Glu Lys Thr
 20 25 30
 gaa aca cat tta gtt ggt gtt aaa aat aat aat aac gaa gta att gca 144
 Glu Thr His Leu Val Gly Val Lys Asn Asn Asn Asn Glu Val Ile Ala
 35 40 45
 gca tgt tta ttg aca gct gta cca gtc atg aag ttt ttt aaa tac ttt 192
 Ala Cys Leu Leu Thr Ala Val Pro Val Met Lys Phe Phe Lys Tyr Phe
 50 55 60
 tac agc aat aga ggc cca gtt ata gat tat gct aac caa gaa ctt gta 240
 Tyr Ser Asn Arg Gly Pro Val Ile Asp Tyr Ala Asn Gln Glu Leu Val
 65 70 75 80
 cat ttt ttc ttt aat gag cta act aaa tat tta aaa aag tat aac tgt 288
 His Phe Phe Phe Asn Glu Leu Thr Lys Tyr Leu Lys Lys Tyr Asn Cys
 85 90 95
 ctc tat gtc cgc ata gat cca tac tta cct tat caa tat aga gac cat 336
 Leu Tyr Val Arg Ile Asp Pro Tyr Leu Pro Tyr Gln Tyr Arg Asp His
 100 105 110
 gac ggt aat ata acg gca aat gct ggc aat gat tgg ttt ttc aat aaa 384
 Asp Gly Asn Ile Thr Ala Asn Ala Gly Asn Asp Trp Phe Phe Asn Lys
 115 120 125
 atg gaa caa ctc gga tac cat cat gat ggc ttt aca aca gga ttt gat 432
 Met Glu Gln Leu Gly Tyr His His Asp Gly Phe Thr Thr Gly Phe Asp
 130 135 140
 cca ata tta caa atc aga ttc cat tct att ctt aat tta aag gat aag 480
 Pro Ile Leu Gln Ile Arg Phe His Ser Ile Leu Asn Leu Lys Asp Lys
 145 150 155 160
 aca gct aaa gat gtt tta aat aat atg gat agt tta cgt aaa aga aat 528
 Thr Ala Lys Asp Val Leu Asn Asn Met Asp Ser Leu Arg Lys Arg Asn
 165 170 175

acc aaa aaa agt tca aaa aat gga gtc aaa gta aag ttc ctt act gaa 576
 Thr Lys Lys Ser Ser Lys Asn Gly Val Lys Val Lys Phe Leu Thr Glu
 180 185 190

gaa gaa cta cct atc ttt cgt tca ttt atg gag cag acg tca gaa tct 624
 Glu Glu Leu Pro Ile Phe Arg Ser Phe Met Glu Gln Thr Ser Glu Ser
 195 200 205

aaa gaa ttc tct gat aga gac gac caa ttt tat tac aat cgg ttt aag 672
 Lys Glu Phe Ser Asp Arg Asp Asp Gln Phe Tyr Tyr Asn Arg Phe Lys
 210 215 220

tac tat aaa gat agg gtg ctt gtg cct cta gca tat tta aaa ttt gat 720
 Tyr Tyr Lys Asp Arg Val Leu Val Pro Leu Ala Tyr Leu Lys Phe Asp
 225 230 235 240

gaa tat ata gaa gaa cta acg aat gaa cga caa act tta gaa aaa gat 768
 Glu Tyr Ile Glu Glu Leu Thr Asn Glu Arg Gln Thr Leu Glu Lys Asp
 245 250 255

tta ggc aaa gca ctt aaa gac att gag aaa cga cca gat aac aaa aaa 816
 Leu Gly Lys Ala Leu Lys Asp Ile Glu Lys Arg Pro Asp Asn Lys Lys
 260 265 270

gct tat aat aaa cga gac aac cta caa caa caa ctc gat gcc aat caa 864
 Ala Tyr Asn Lys Arg Asp Asn Leu Gln Gln Gln Leu Asp Ala Asn Gln
 275 280 285

caa aag tta aat gag gct aat cag tta caa gcg gaa cac ggt aat gag 912
 Gln Lys Leu Asn Glu Ala Asn Gln Leu Gln Ala Glu His Gly Asn Glu
 290 295 300

tta cct atc tct gcc ggt ttc ttt att att aat ccg ttt gaa gtt gta 960
 Leu Pro Ile Ser Ala Gly Phe Phe Ile Ile Asn Pro Phe Glu Val Val
 305 310 315 320

tac tac gct gga ggt acc gct aat aaa tat cgt cat ttt gca ggt agt 1008
 Tyr Tyr Ala Gly Gly Thr Ala Asn Lys Tyr Arg His Phe Ala Gly Ser
 325 330 335

tac gcg gtt cag tgg act atg att aac tat gct atc gaa cac ggc ata 1056
 Tyr Ala Val Gln Trp Thr Met Ile Asn Tyr Ala Ile Glu His Gly Ile
 340 345 350

gac aga tat aat ttc tac ggc att agt gga aac ttc tca gat gat gct 1104
 Asp Arg Tyr Asn Phe Tyr Gly Ile Ser Gly Asn Phe Ser Asp Asp Ala
 355 360 365

gaa gac gca ggt gtc att cgc ttt aaa aaa ggt tat ggt gca gaa gtg 1152
 Glu Asp Ala Gly Val Ile Arg Phe Lys Lys Gly Tyr Gly Ala Glu Val
 370 375 380

att gaa tac gtt ggt gat ttt gta aaa cct ata aat aaa cct atg tat 1200
 Ile Glu Tyr Val Gly Asp Phe Val Lys Pro Ile Asn Lys Pro Met Tyr

385

390

395

400

aaa ott tat tca gtg tta aaa cga att caa aat aag cta tag
 Lys Leu Tyr Ser Val Leu Lys Arg Ile Gln Asn Lys Leu *
 405 410

1242

aggagaatgg attaattatg aaatttacag agttaaac

1280

<210> 43

<211> 413

<212> PRT

<213> Staphylococcus lugdunensis femA

<400> 43

Thr Ala Asn Glu Phe Gly Asp Phe Thr Asp Gln Met Pro Tyr Ser His
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 Phe Thr Gln Met Thr Gly Asn Tyr Asn Leu Lys Val Ala Glu Lys Thr
 20 25 30
 Glu Thr His Leu Val Gly Val Lys Asn Asn Asn Asn Glu Val Ile Ala
 35 40 45
 Ala Cys Leu Leu Thr Ala Val Pro Val Met Lys Phe Phe Lys Tyr Phe
 50 55 60
 Tyr Ser Asn Arg Gly Pro Val Ile Asp Tyr Ala Asn Gln Glu Leu Val
 65 70 75 80
 His Phe Phe Phe Asn Glu Leu Thr Lys Tyr Leu Lys Lys Tyr Asn Cys
 85 90 95
 Leu Tyr Val Arg Ile Asp Pro Tyr Leu Pro Tyr Gln Tyr Arg Asp His
 100 105 110
 Asp Gly Asn Ile Thr Ala Asn Ala Gly Asn Asp Trp Phe Phe Asn Lys
 115 120 125
 Met Glu Gln Leu Gly Tyr His His Asp Gly Phe Thr Thr Gly Phe Asp
 130 135 140
 Pro Ile Leu Gln Ile Arg Phe His Ser Ile Leu Asn Leu Lys Asp Lys
 145 150 155 160
 Thr Ala Lys Asp Val Leu Asn Asn Met Asp Ser Leu Arg Lys Arg Asn
 165 170 175
 Thr Lys Lys Ser Ser Lys Asn Gly Val Lys Val Lys Phe Leu Thr Glu
 180 185 190
 Glu Glu Leu Pro Ile Phe Arg Ser Phe Met Glu Gln Thr Ser Glu Ser
 195 200 205
 Lys Glu Phe Ser Asp Arg Asp Asp Gln Phe Tyr Tyr Asn Arg Phe Lys
 210 215 220
 Tyr Tyr Lys Asp Arg Val Leu Val Pro Leu Ala Tyr Leu Lys Phe Asp
 225 230 235 240
 Glu Tyr Ile Glu Glu Leu Thr Asn Glu Arg Gln Thr Leu Glu Lys Asp
 245 250 255
 Leu Gly Lys Ala Leu Lys Asp Ile Glu Lys Arg Pro Asp Asn Lys Lys
 260 265 270
 Ala Tyr Asn Lys Arg Asp Asn Leu Gln Gln Gln Leu Asp Ala Asn Gln
 275 280 285
 Gln Lys Leu Asn Glu Ala Asn Gln Leu Gln Ala Glu His Gly Asn Glu
 290 295 300
 Leu Pro Ile Ser Ala Gly Phe Phe Ile Ile Asn Pro Phe Glu Val Val
 305 310 315 320
 Tyr Tyr Ala Gly Gly Thr Ala Asn Lys Tyr Arg His Phe Ala Gly Ser

	325		330		335										
Tyr	Ala	Val	Gln	Trp	Thr	Met	Ile	Asn	Tyr	Ala	Ile	Glu	His	Gly	Ile
	340							345					350		
Asp	Arg	Tyr	Asn	Phe	Tyr	Gly	Ile	Ser	Gly	Asn	Phe	Ser	Asp	Asp	Ala
	355							360					365		
Glu	Asp	Ala	Gly	Val	Ile	Arg	Phe	Lys	Lys	Gly	Tyr	Gly	Ala	Glu	Val
	370							375					380		
Ile	Glu	Tyr	Val	Gly	Asp	Phe	Val	Lys	Pro	Ile	Asn	Lys	Pro	Met	Tyr
	385							390					395		400
Lys	Leu	Tyr	Ser	Val	Leu	Lys	Arg	Ile	Gln	Asn	Lys	Leu			
				405					410						

<210> 44
 <211> 1295
 <212> DNA
 <213> Staphylococcus xylosus femA

<220>
 <221> CDS
 <222> (1) ... (1245)

<400> 44

acg caa aag agt ttg ggt gca ttt tca gat aaa atg cca aat agc cat 48
 Thr Gln Lys Ser Leu Gly Ala Phe Ser Asp Lys Met Pro Asn Ser His
 1 5 10 15

ttc acg caa atg gta ggg aat tat gaa ttg aaa att gca gaa agt act 96
 Phe Thr Gln Met Val Gly Asn Tyr Glu Leu Lys Ile Ala Glu Ser Thr
 20 25 30

gaa aca cat tta gta ggt ata aaa aac aat gat aat gaa gtc att gca 144
 Glu Thr His Leu Val Gly Ile Lys Asn Asn Asp Asn Glu Val Ile Ala
 35 40 45

gct tgt tta tta act gca gta cca gta atg aaa ttc ttt aag tat ttt 192
 Ala Cys Leu Leu Thr Ala Val Pro Val Met Lys Phe Phe Lys Tyr Phe
 50 55 60

tat act aat aga ggt ccg gtt ata gat ttt gaa aat aaa gaa tta gtg 240
 Tyr Thr Asn Arg Gly Pro Val Ile Asp Phe Glu Asn Lys Glu Leu Val
 65 70 75 80

cat tac ttt ttc aat gaa cta tct aaa tat gtg aaa aaa cat aat gcg 288
 His Tyr Phe Phe Asn Glu Leu Ser Lys Tyr Val Lys Lys His Asn Ala
 85 90 95

ctt tat tta aga gtt gat cct tat tta gca tat caa tac cgt aat cat 336
 Leu Tyr Leu Arg Val Asp Pro Tyr Leu Ala Tyr Gln Tyr Arg Asn His
 100 105 110

gat ggt gag gta ttg gaa aat gca gga cat gat tgg att ttc gat aaa 384
 Asp Gly Glu Val Leu Glu Asn Ala Gly His Asp Trp Ile Phe Asp Lys
 115 120 125

atg aag cag ctt gga tat aaa cac caa gga ttt tta act ggt ttc gat 432
 Met Lys Gln Leu Gly Tyr Lys His Gln Gly Phe Leu Thr Gly Phe Asp
 130 135 140

tca att att caa att agg ttc cac tct gta ctg gat tta gta ggt aaa 480
 Ser Ile Ile Gln Ile Arg Phe His Ser Val Leu Asp Leu Val Gly Lys
 145 150 155 160

act gct aaa gat gta cta aat ggt atg gat agt tta cgt aaa cgt aat 528
 Thr Ala Lys Asp Val Leu Asn Gly Met Asp Ser Leu Arg Lys Arg Asn
 165 170 175

act aaa aaa gta caa aaa aat ggc gtg aaa gta agg ttc tta agg gaa 576
 Thr Lys Lys Val Gln Lys Asn Gly Val Lys Val Arg Phe Leu Arg Glu
 180 185 190

gat gag ttg cca att ttc cgt tca ttc atg gaa gat aca tct gaa act 624
 Asp Glu Leu Pro Ile Phe Arg Ser Phe Met Glu Asp Thr Ser Glu Thr
 195 200 205

aaa gac ttt gac gat aga gac gat ggc ttt tac tac aat aga tta agg 672
 Lys Asp Phe Asp Asp Arg Asp Asp Gly Phe Tyr Tyr Asn Arg Leu Arg
 210 215 220

D1
 tat tat aaa gat cgc gta tta gta cct cta gct tat atg gat ttc aat 720
 Tyr Tyr Lys Asp Arg Val Leu Val Pro Leu Ala Tyr Met Asp Phe Asn
 225 230 235 240

gaa tat att gaa gaa ttg caa gct gaa cgt gag gtg tta agc aaa gat 768
 Glu Tyr Ile Glu Glu Leu Gln Ala Glu Arg Glu Val Leu Ser Lys Asp
 245 250 255

atc aat aaa gca gta aaa gat atc gag aaa aga cct gaa aat aaa aaa 816
 Ile Asn Lys Ala Val Lys Asp Ile Glu Lys Arg Pro Glu Asn Lys Lys
 260 265 270

gca tat aat aaa aaa gat aat cta gag aaa caa ctt ata gcg aat caa 864
 Ala Tyr Asn Lys Lys Asp Asn Leu Glu Lys Gln Leu Ile Ala Asn Gln
 275 280 285

caa aaa att gat gaa gct aaa act cta caa gag aag cat ggt aac gaa 912
 Gln Lys Ile Asp Glu Ala Lys Thr Leu Gln Glu Lys His Gly Asn Glu
 290 295 300

cta cca atc tca gca gca tat ttc atc att aac cct tat gaa gta gtg 960
 Leu Pro Ile Ser Ala Ala Tyr Phe Ile Ile Asn Pro Tyr Glu Val Val
 305 310 315 320

tat tat gcg ggt gga acg tca aat gag ttt aga cat ttt gct ggt agt 1008
 Tyr Tyr Ala Gly Gly Thr Ser Asn Glu Phe Arg His Phe Ala Gly Ser
 325 330 335

tat gcc att caa tgg aag atg att aac tat gct att gac cat aat att 1056
 Tyr Ala Ile Gln Trp Lys Met Ile Asn Tyr Ala Ile Asp His Asn Ile
 340 345 350

gat aga tat aat ttt tat gga att agt ggt cat ttt aca gaa gat gca 1104
 Asp Arg Tyr Asn Phe Tyr Gly Ile Ser Gly His Phe Thr Glu Asp Ala
 355 360 365

gaa gat gcc ggt gta gtt aaa ttt aaa aaa gga ttt aat gcg gat gta 1152
 Glu Asp Ala Gly Val Val Lys Phe Lys Lys Gly Phe Asn Ala Asp Val
 370 375 380

gtg gaa tat gtt ggt gat ttt att aaa cca atc aat aaa cca atg tac 1200
 Val Glu Tyr Val Gly Asp Phe Ile Lys Pro Ile Asn Lys Pro Met Tyr
 385 390 395 400

aaa att tat acg aca tta aag aaa att aaa gat aaa aag aaa taa 1245
 Lys Ile Tyr Thr Thr Leu Lys Lys Ile Lys Asp Lys Lys Lys *
 405 410

acatttaata gaagggaact aagctagaat gaaatttaca gagttaaacc 1295

<210> 45

<211> 414

<212> PRT

<213> Staphylococcus xylosus femA

<400> 45

Thr Gln Lys Ser Leu Gly Ala Phe Ser Asp Lys Met Pro Asn Ser His
 1 5 10 15
 Phe Thr Gln Met Val Gly Asn Tyr Glu Leu Lys Ile Ala Glu Ser Thr
 20 25 30
 Glu Thr His Leu Val Gly Ile Lys Asn Asn Asp Asn Glu Val Ile Ala
 35 40 45
 Ala Cys Leu Leu Thr Ala Val Pro Val Met Lys Phe Phe Lys Tyr Phe
 50 55 60
 Tyr Thr Asn Arg Gly Pro Val Ile Asp Phe Glu Asn Lys Glu Leu Val
 65 70 75 80
 His Tyr Phe Phe Asn Glu Leu Ser Lys Tyr Val Lys Lys His Asn Ala
 85 90 95
 Leu Tyr Leu Arg Val Asp Pro Tyr Leu Ala Tyr Gln Tyr Arg Asn His
 100 105 110
 Asp Gly Glu Val Leu Glu Asn Ala Gly His Asp Trp Ile Phe Asp Lys
 115 120 125
 Met Lys Gln Leu Gly Tyr Lys His Gln Gly Phe Leu Thr Gly Phe Asp
 130 135 140
 Ser Ile Ile Gln Ile Arg Phe His Ser Val Leu Asp Leu Val Gly Lys
 145 150 155 160
 Thr Ala Lys Asp Val Leu Asn Gly Met Asp Ser Leu Arg Lys Arg Asn
 165 170 175
 Thr Lys Lys Val Gln Lys Asn Gly Val Lys Val Arg Phe Leu Arg Glu
 180 185 190
 Asp Glu Leu Pro Ile Phe Arg Ser Phe Met Glu Asp Thr Ser Glu Thr
 195 200 205
 Lys Asp Phe Asp Asp Arg Asp Asp Gly Phe Tyr Tyr Asn Arg Leu Arg
 210 215 220
 Tyr Tyr Lys Asp Arg Val Leu Val Pro Leu Ala Tyr Met Asp Phe Asn
 225 230 235 240

His Phe Phe Phe Asn Glu Leu Ser Lys Tyr Val Lys Lys His Asn Cys
85 90 95

ctt tat cta aga gtt gac cct tat ctt cct tat caa tac tta aat cat 336
Leu Tyr Leu Arg Val Asp Pro Tyr Leu Pro Tyr Gln Tyr Leu Asn His
100 105 110

gac ggt gaa att att gga aat gct ggc cat gat tgg ttt ttc aat aag 384
Asp Gly Glu Ile Ile Gly Asn Ala Gly His Asp Trp Phe Phe Asn Lys
115 120 125

atg gaa gaa tta gga ttt gaa cat gaa ggc ttt cat aaa ggc ttc cat 432
Met Glu Glu Leu Gly Phe Glu His Glu Gly Phe His Lys Gly Phe His
130 135 140

cct atc tta caa gta aga tat cat tca gtt tta gat tta aaa gat aaa 480
Pro Ile Leu Gln Val Arg Tyr His Ser Val Leu Asp Leu Lys Asp Lys
145 150 155 160

acg gct aaa gat gta ctc aaa gga atg gat agt tta aga aag cgt aat 528
Thr Ala Lys Asp Val Leu Lys Gly Met Asp Ser Leu Arg Lys Arg Asn
165 170 175

act aag aaa gta caa aaa aat ggt gtc aaa gtc cgt ttc cta tcc gaa 576
Thr Lys Lys Val Gln Lys Asn Gly Val Lys Val Arg Phe Leu Ser Glu
180 185 190

gat gaa tta cct atc ttt aga tca ttt atg gaa gat act aca gaa acg 624
Asp Glu Leu Pro Ile Phe Arg Ser Phe Met Glu Asp Thr Thr Glu Thr
195 200 205

aaa gag ttc gcc gat aga gat gat agt ttc tat tat aat cga tta aaa 672
Lys Glu Phe Ala Asp Arg Asp Asp Ser Phe Tyr Tyr Asn Arg Leu Lys
210 215 220

tac ttt aaa gat aga gta tta gta cca tta gca tat gtt gac ttc gat 720
Tyr Phe Lys Asp Arg Val Leu Val Pro Leu Ala Tyr Val Asp Phe Asp
225 230 235 240

gag tat att gaa gaa ctt aat aat gaa aga gat gtt ctt aat aaa gat 768
Glu Tyr Ile Glu Glu Leu Asn Asn Glu Arg Asp Val Leu Asn Lys Asp
245 250 255

tta aat aag gcg ctc aaa gat att gag aag aga cct gat aat aag aaa 816
Leu Asn Lys Ala Leu Lys Asp Ile Glu Lys Arg Pro Asp Asn Lys Lys
260 265 270

gct tat aac aaa aga gat aat ctt caa caa caa tta gat gca aat caa 864
Ala Tyr Asn Lys Arg Asp Asn Leu Gln Gln Gln Leu Asp Ala Asn Gln
275 280 285

caa aaa att gat gaa gct aaa aac tta caa caa gaa cat ggt aat gaa 912
Gln Lys Ile Asp Glu Ala Lys Asn Leu Gln Gln Glu His Gly Asn Glu
290 295 300

tta cct att tca gct gga tat ttc ttc att aat ccg ttt gaa gtt gtt 960
 Leu Pro Ile Ser Ala Gly Tyr Phe Phe Ile Asn Pro Phe Glu Val Val
 305 310 315 320
 tat tac gca ggt ggc aca tcg aat cgt tat cgt cac tat gcc gga agt 1008
 Tyr Tyr Ala Gly Gly Thr Ser Asn Arg Tyr Arg His Tyr Ala Gly Ser
 325 330 335
 tat gca att caa tgg aaa atg ata aac tat gct tta gaa cat gga att 1056
 Tyr Ala Ile Gln Trp Lys Met Ile Asn Tyr Ala Leu Glu His Gly Ile
 340 345 350
 aac cgt tat aat ttt tat gga gtt agt ggg gac ttc agt gaa gac gct 1104
 Asn Arg Tyr Asn Phe Tyr Gly Val Ser Gly Asp Phe Ser Glu Asp Ala
 355 360 365
 gaa gat gta gga gta att aag ttc aaa aaa ggc tat aat gct gat gtt 1152
 Glu Asp Val Gly Val Ile Lys Phe Lys Lys Gly Tyr Asn Ala Asp Val
 370 375 380
 att gaa tat gta ggt gat ttt atc aag cca atc aat aaa cct atg tat 1200
 Ile Glu Tyr Val Gly Asp Phe Ile Lys Pro Ile Asn Lys Pro Met Tyr
 385 390 395 400
 gca atc tat aac gca ctt aaa aag tta aag aaa tag atttttttac 1246
 Ala Ile Tyr Asn Ala Leu Lys Lys Leu Lys Lys *
 405 410
 caaccctaatt atctaattat gaaatttaca gagtta 1283

<210> 47
 <211> 411
 <212> PRT
 <213> Staphylococcus capitis femA

<400> 47
 Thr Ala Lys Glu Phe Ser Asp Phe Thr Asp Gln Met Pro Tyr Ser His
 1 5 10 15
 Phe Thr Gln Met Glu Gly Asn Tyr Glu Leu Lys Val Ala Glu Gly Thr
 20 25 30
 Asp Ser His Leu Val Gly Ile Lys Asn Asn Asp Asn Gln Val Ile Ala
 35 40 45
 Ala Cys Leu Leu Thr Ala Val Pro Val Met Lys Ile Phe Lys Tyr Phe
 50 55 60
 Tyr Ser Asn Arg Gly Pro Val Ile Asp Tyr Asp Asn Lys Glu Leu Val
 65 70 75 80
 His Phe Phe Phe Asn Glu Leu Ser Lys Tyr Val Lys Lys His Asn Cys
 85 90 95
 Leu Tyr Leu Arg Val Asp Pro Tyr Leu Pro Tyr Gln Tyr Leu Asn His
 100 105 110
 Asp Gly Glu Ile Ile Gly Asn Ala Gly His Asp Trp Phe Phe Asn Lys
 115 120 125
 Met Glu Glu Leu Gly Phe Glu His Glu Gly Phe His Lys Gly Phe His
 130 135 140
 Pro Ile Leu Gln Val Arg Tyr His Ser Val Leu Asp Leu Lys Asp Lys

145 150 155 160
 Thr Ala Lys Asp Val Leu Lys Gly Met Asp Ser Leu Arg Lys Arg Asn
 165 170 175
 Thr Lys Lys Val Gln Lys Asn Gly Val Lys Val Arg Phe Leu Ser Glu
 180 185 190
 Asp Glu Leu Pro Ile Phe Arg Ser Phe Met Glu Asp Thr Thr Glu Thr
 195 200 205
 Lys Glu Phe Ala Asp Arg Asp Asp Ser Phe Tyr Tyr Asn Arg Leu Lys
 210 215 220
 Tyr Phe Lys Asp Arg Val Leu Val Pro Leu Ala Tyr Val Asp Phe Asp
 225 230 235 240
 Glu Tyr Ile Glu Glu Leu Asn Asn Glu Arg Asp Val Leu Asn Lys Asp
 245 250 255
 Leu Asn Lys Ala Leu Lys Asp Ile Glu Lys Arg Pro Asp Asn Lys Lys
 260 265 270
 Ala Tyr Asn Lys Arg Asp Asn Leu Gln Gln Gln Leu Asp Ala Asn Gln
 275 280 285
 Gln Lys Ile Asp Glu Ala Lys Asn Leu Gln Gln Glu His Gly Asn Glu
 290 295 300
 Leu Pro Ile Ser Ala Gly Tyr Phe Phe Ile Asn Pro Phe Glu Val Val
 305 310 315 320
 Tyr Tyr Ala Gly Gly Thr Ser Asn Arg Tyr Arg His Tyr Ala Gly Ser
 325 330 335
 Tyr Ala Ile Gln Trp Lys Met Ile Asn Tyr Ala Leu Glu His Gly Ile
 340 345 350
 Asn Arg Tyr Asn Phe Tyr Gly Val Ser Gly Asp Phe Ser Glu Asp Ala
 355 360 365
 Glu Asp Val Gly Val Ile Lys Phe Lys Lys Gly Tyr Asn Ala Asp Val
 370 375 380
 Ile Glu Tyr Val Gly Asp Phe Ile Lys Pro Ile Asn Lys Pro Met Tyr
 385 390 395 400
 Ala Ile Tyr Asn Ala Leu Lys Lys Leu Lys Lys
 405 410

<210> 48
 <211> 1297
 <212> DNA
 <213> Staphylococcus schleiferi femA

<220>
 <221> CDS
 <222> (1)...(1248)

<400> 48
 acg acg gct gaa ttt ggt gcg ttt aca gat caa atg cca tat agc cat 48
 Thr Thr Ala Glu Phe Gly Ala Phe Thr Asp Gln Met Pro Tyr Ser His
 1 5 10 15
 ttc acg caa atg gta ggg aac tat gaa tta aag gtt gct gaa ggt gtt 96
 Phe Thr Gln Met Val Gly Asn Tyr Glu Leu Lys Val Ala Glu Gly Val
 20 25 30
 gaa aca cat ctt gtc ggc att aaa gat aac aac aat aac gta cta gca 144
 Glu Thr His Leu Val Gly Ile Lys Asp Asn Asn Asn Asn Val Leu Ala

35

40

45

gca tgt tta ctg aca gca gtg cca gta atg aag ttt ttt aaa tat ttt 192
 Ala Cys Leu Leu Thr Ala Val Pro Val Met Lys Phe Phe Lys Tyr Phe
 50 55 60

tat tca aac cgc gga cca gtc atg gac tac gaa aat aaa gag ctc gtt 240
 Tyr Ser Asn Arg Gly Pro Val Met Asp Tyr Glu Asn Lys Glu Leu Val
 65 70 75 80

cat ttc ttt ttt aat gaa ctt tca aaa tat gtt aag aaa tat cac gca 288
 His Phe Phe Phe Asn Glu Leu Ser Lys Tyr Val Lys Lys Tyr His Ala
 85 90 95

ttg tat ttg aga gta gac cct tat tta cca atg tta aag cga aac cat 336
 Leu Tyr Leu Arg Val Asp Pro Tyr Leu Pro Met Leu Lys Arg Asn His
 100 105 110

gat ggt gaa gtg att gaa aga tac ggc agt gac tgg ttt ttt gat aaa 384
 Asp Gly Glu Val Ile Glu Arg Tyr Gly Ser Asp Trp Phe Phe Asp Lys
 115 120 125

atg gct gaa tta aac ttt gaa cat gaa ggt ttc aca act ggg ttt gat 432
 Met Ala Glu Leu Asn Phe Glu His Glu Gly Phe Thr Thr Gly Phe Asp
 130 135 140

aca ata agg caa att cgt ttt cat tct gtg ctc gat gtt gaa aat aaa 480
 Thr Ile Arg Gln Ile Arg Phe His Ser Val Leu Asp Val Glu Asn Lys
 145 150 155 160

aca tca aaa gac atc tta aat caa atg gat aat tta agg aaa aga aat 528
 Thr Ser Lys Asp Ile Leu Asn Gln Met Asp Asn Leu Arg Lys Arg Asn
 165 170 175

acg aaa aaa gta cag aaa aat ggt gtg aaa gtc cgc tat cta aac gaa 576
 Thr Lys Lys Val Gln Lys Asn Gly Val Lys Val Arg Tyr Leu Asn Glu
 180 185 190

gat gaa tta cat att ttc cgt tcg ttt atg gaa gat aca tct gaa aca 624
 Asp Glu Leu His Ile Phe Arg Ser Phe Met Glu Asp Thr Ser Glu Thr
 195 200 205

aaa gat ttt gta gat aga gat gac gat ttt tat tat cat cgt atg aaa 672
 Lys Asp Phe Val Asp Arg Asp Asp Asp Phe Tyr Tyr His Arg Met Lys
 210 215 220

tac tat aaa gat cgt gtc cgc gta cca cta gcg tat att gat ttt aat 720
 Tyr Tyr Lys Asp Arg Val Arg Val Pro Leu Ala Tyr Ile Asp Phe Asn
 225 230 235 240

gca tat tta gca gag ctc aac act gaa gcg caa gac ttt aaa aaa gaa 768
 Ala Tyr Leu Ala Glu Leu Asn Thr Glu Ala Gln Asp Phe Lys Lys Glu
 245 250 255

att gca aaa gca gat aaa gac atc gac aag cgt cct gaa aat cag aaa 816

Ile Ala Lys Ala Asp Lys Asp Ile Asp Lys Arg Pro Glu Asn Gln Lys
 260 265 270

gcc ata aat aaa aag aaa aat tta gag caa caa cta gaa gcg aat caa 864
 Ala Ile Asn Lys Lys Lys Asn Leu Glu Gln Gln Leu Glu Ala Asn Gln
 275 280 285

gct aaa ata aaa gaa gca gaa aca ttg caa ctt aaa cac ggt gac aca 912
 Ala Lys Ile Lys Glu Ala Glu Thr Leu Gln Leu Lys His Gly Asp Thr
 290 295 300

tta ccg att tcg gct gga ttc ttt att att aat cca ttt gag gtt gtt 960
 Leu Pro Ile Ser Ala Gly Phe Phe Ile Ile Asn Pro Phe Glu Val Val
 305 310 315 320

tat tat gca ggc ggc aca gca aac gaa ttt cgt cat ttt gct gga agc 1008
 Tyr Tyr Ala Gly Gly Thr Ala Asn Glu Phe Arg His Phe Ala Gly Ser
 325 330 335

tac gca gtg caa tgg gaa atg att aat tat gcg att gat tat caa att 1056
 Tyr Ala Val Gln Trp Glu Met Ile Asn Tyr Ala Ile Asp Tyr Gln Ile
 340 345 350

cca aga tat aac ttt tat ggc att agt ggt gat ttt tca gaa gat gca 1104
 Pro Arg Tyr Asn Phe Tyr Gly Ile Ser Gly Asp Phe Ser Glu Asp Ala
 355 360 365

gaa gat gca ggt gtg ata aaa ttt aaa aaa ggc tat aat gca gaa gta 1152
 Glu Asp Ala Gly Val Ile Lys Phe Lys Lys Gly Tyr Asn Ala Glu Val
 370 375 380

ata gaa tat gtc ggt gat ttt att aag cct ata aac aaa cct gcc tat 1200
 Ile Glu Tyr Val Gly Asp Phe Ile Lys Pro Ile Asn Lys Pro Ala Tyr
 385 390 395 400

aca gtc tac tta aaa tta aag caa tta aaa gac aag ata aaa aga taa 1248
 Thr Val Tyr Leu Lys Leu Lys Gln Leu Lys Asp Lys Ile Lys Arg *
 405 410 415

gatatagcaa agagaagggg atttattggt atgaaattta cagagttaa 1297

<210> 49

<211> 415

<212> PRT

<213> Staphylococcus schleiferi femA

<400> 49

Thr Thr Ala Glu Phe Gly Ala Phe Thr Asp Gln Met Pro Tyr Ser His
 1 5 10 15

Phe Thr Gln Met Val Gly Asn Tyr Glu Leu Lys Val Ala Glu Gly Val
 20 25 30

Glu Thr His Leu Val Gly Ile Lys Asp Asn Asn Asn Asn Val Leu Ala
 35 40 45

Ala Cys Leu Leu Thr Ala Val Pro Val Met Lys Phe Phe Lys Tyr Phe
 50 55 60

Tyr Ser Asn Arg Gly Pro Val Met Asp Tyr Glu Asn Lys Glu Leu Val
 65 70 75 80
 His Phe Phe Phe Asn Glu Leu Ser Lys Tyr Val Lys Lys Tyr His Ala
 85 90 95
 Leu Tyr Leu Arg Val Asp Pro Tyr Leu Pro Met Leu Lys Arg Asn His
 100 105 110
 Asp Gly Glu Val Ile Glu Arg Tyr Gly Ser Asp Trp Phe Phe Asp Lys
 115 120 125
 Met Ala Glu Leu Asn Phe Glu His Glu Gly Phe Thr Thr Gly Phe Asp
 130 135 140
 Thr Ile Arg Gln Ile Arg Phe His Ser Val Leu Asp Val Glu Asn Lys
 145 150 155 160
 Thr Ser Lys Asp Ile Leu Asn Gln Met Asp Asn Leu Arg Lys Arg Asn
 165 170 175
 Thr Lys Lys Val Gln Lys Asn Gly Val Lys Val Arg Tyr Leu Asn Glu
 180 185 190
 Asp Glu Leu His Ile Phe Arg Ser Phe Met Glu Asp Thr Ser Glu Thr
 195 200 205
 Lys Asp Phe Val Asp Arg Asp Asp Phe Tyr Tyr His Arg Met Lys
 210 215 220
 Tyr Tyr Lys Asp Arg Val Arg Val Pro Leu Ala Tyr Ile Asp Phe Asn
 225 230 235 240
 Ala Tyr Leu Ala Glu Leu Asn Thr Glu Ala Gln Asp Phe Lys Lys Glu
 245 250 255
 Ile Ala Lys Ala Asp Lys Asp Ile Asp Lys Arg Pro Glu Asn Gln Lys
 260 265 270
 Ala Ile Asn Lys Lys Lys Asn Leu Glu Gln Gln Leu Glu Ala Asn Gln
 275 280 285
 Ala Lys Ile Lys Glu Ala Glu Thr Leu Gln Leu Lys His Gly Asp Thr
 290 295 300
 Leu Pro Ile Ser Ala Gly Phe Phe Ile Ile Asn Pro Phe Glu Val Val
 305 310 315 320
 Tyr Tyr Ala Gly Gly Thr Ala Asn Glu Phe Arg His Phe Ala Gly Ser
 325 330 335
 Tyr Ala Val Gln Trp Glu Met Ile Asn Tyr Ala Ile Asp Tyr Gln Ile
 340 345 350
 Pro Arg Tyr Asn Phe Tyr Gly Ile Ser Gly Asp Phe Ser Glu Asp Ala
 355 360 365
 Glu Asp Ala Gly Val Ile Lys Phe Lys Lys Gly Tyr Asn Ala Glu Val
 370 375 380
 Ile Glu Tyr Val Gly Asp Phe Ile Lys Pro Ile Asn Lys Pro Ala Tyr
 385 390 395 400
 Thr Val Tyr Leu Lys Leu Lys Gln Leu Lys Asp Lys Ile Lys Arg
 405 410 415

<210> 50
 <211> 1284
 <212> DNA
 <213> Staphylococcus sciuri femA

<220>
 <221> CDS
 <222> (1)...(1233)

<400> 50

aca ctg gaa ttt gaa gct ttt aca aat aaa atg ccg tac gcg cat ttt	48
Thr Leu Glu Phe Glu Ala Phe Thr Asn Lys Met Pro Tyr Ala His Phe	
1 5 10 15	
aca caa gca gta ggt aat tat gaa tta aaa aca tct gaa ggt act tca	96
Thr Gln Ala Val Gly Asn Tyr Glu Leu Lys Thr Ser Glu Gly Thr Ser	
20 25 30	
aca cat tta gta ggg gtc aaa gat aat caa ggt gaa gta tta gct gcg	144
Thr His Leu Val Gly Val Lys Asp Asn Gln Gly Glu Val Leu Ala Ala	
35 40 45	
tgt ctg tta aca agt gta cca gtt atg aag aaa ttt aat tac ttt tac	192
Cys Leu Leu Thr Ser Val Pro Val Met Lys Lys Phe Asn Tyr Phe Tyr	
50 55 60	
tca aat aga gga cca gta atg gat tat gac aac aaa gaa ctt gtt gac	240
Ser Asn Arg Gly Pro Val Met Asp Tyr Asp Asn Lys Glu Leu Val Asp	
65 70 75 80	
ttt ttc ttt aaa gaa atc gtg agc tat tta aaa agt tat aaa gga tta	288
Phe Phe Phe Lys Glu Ile Val Ser Tyr Leu Lys Ser Tyr Lys Gly Leu	
85 90 95	
ttc ttt aga atc gat cct tac ttg cca tat caa cta aga gat cat gat	336
Phe Phe Arg Ile Asp Pro Tyr Leu Pro Tyr Gln Leu Arg Asp His Asp	
100 105 110	
ggc aat att aaa aaa tca ttc aac cgt gat ggt tta att aaa caa ttt	384
Gly Asn Ile Lys Lys Ser Phe Asn Arg Asp Gly Leu Ile Lys Gln Phe	
115 120 125	
gaa tca tta ggt tat gaa cac caa ggc ttc aca act ggt ttc cac cca	432
Glu Ser Leu Gly Tyr Glu His Gln Gly Phe Thr Thr Gly Phe His Pro	
130 135 140	
ata cat caa att aga tgg cat tct gta ctt gat tta gaa agt atg gac	480
Ile His Gln Ile Arg Trp His Ser Val Leu Asp Leu Glu Ser Met Asp	
145 150 155 160	
gaa aag acg ctc atc aag aac atg gac agt tta aga aaa aga aat act	528
Glu Lys Thr Leu Ile Lys Asn Met Asp Ser Leu Arg Lys Arg Asn Thr	
165 170 175	
aaa aaa gtt caa aaa aat ggt gtt aaa gtt cgt ttt cta tct aaa gat	576
Lys Lys Val Gln Lys Asn Gly Val Lys Val Arg Phe Leu Ser Lys Asp	
180 185 190	
gaa atg ccg ata ttc cgt caa ttt atg gaa gat act aca gag aag aaa	624
Glu Met Pro Ile Phe Arg Gln Phe Met Glu Asp Thr Thr Glu Lys Lys	
195 200 205	
gat ttc aac gat cgt ggc gat gac ttc tat tac aat aga tta aaa tac	672
Asp Phe Asn Asp Arg Gly Asp Asp Phe Tyr Tyr Asn Arg Leu Lys Tyr	

210

215

220

ttt gaa aat gta aag att cct tta gca tat ata gac ttt gaa act tac 720
 Phe Glu Asn Val Lys Ile Pro Leu Ala Tyr Ile Asp Phe Glu Thr Tyr
 225 230 235 240

att cca caa tta gaa aaa gaa cat gaa caa tac aac aaa gat att gca 768
 Ile Pro Gln Leu Glu Lys Glu His Glu Gln Tyr Asn Lys Asp Ile Ala
 245 250 255

aaa gct gaa aaa gat tta gaa aag aaa cca gat aat caa aaa acg att 816
 Lys Ala Glu Lys Asp Leu Glu Lys Lys Pro Asp Asn Gln Lys Thr Ile
 260 265 270

aat aaa ata gac aac tta aaa caa caa aga gaa gca aat gaa gct aaa 864
 Asn Lys Ile Asp Asn Leu Lys Gln Gln Arg Glu Ala Asn Glu Ala Lys
 275 280 285

tta gaa gaa gca ctt caa cta caa caa gaa cat ggt gat aca tta cca 912
 Leu Glu Glu Ala Leu Gln Leu Gln Gln Glu His Gly Asp Thr Leu Pro
 290 295 300

ata gca gct ggt ttc ttt att att aat cca ttt gaa gtt gta tat tat 960
 Ile Ala Ala Gly Phe Phe Ile Ile Asn Pro Phe Glu Val Val Tyr Tyr
 305 310 315 320

gca ggt ggt tca tcg aat gaa tat cgt cac ttt gca ggt agt tat gca 1008
 Ala Gly Gly Ser Ser Asn Glu Tyr Arg His Phe Ala Gly Ser Tyr Ala
 325 330 335

att cag tgg gaa atg att aaa tac gcg tta gat cac aac att gac cgt 1056
 Ile Gln Trp Glu Met Ile Lys Tyr Ala Leu Asp His Asn Ile Asp Arg
 340 345 350

tat aac ttc tat ggt atc agc gga gac ttc tca gaa gat gca cct gat 1104
 Tyr Asn Phe Tyr Gly Ile Ser Gly Asp Phe Ser Glu Asp Ala Pro Asp
 355 360 365

gtt ggc gtt att aaa ttt aaa aaa ggt tac aat gca gat gtt tat gaa 1152
 Val Gly Val Ile Lys Phe Lys Lys Gly Tyr Asn Ala Asp Val Tyr Glu
 370 375 380

tat att ggt gat ttc gtt aaa cca att aat aaa cca gcg tac aaa gca 1200
 Tyr Ile Gly Asp Phe Val Lys Pro Ile Asn Lys Pro Ala Tyr Lys Ala
 385 390 395 400

tat aca aca cta aaa aaa gta tta aaa aaa taa atgattttca gtaagagagg 1253
 Tyr Thr Thr Leu Lys Lys Val Leu Lys Lys *
 405 410

aatttagata atatgaaatt tacagagtta a 1284

<210> 51
 <211> 410
 <212> PRT

<213> Staphylococcus sciuri femA

<400> 51

Thr Leu Glu Phe Glu Ala Phe Thr Asn Lys Met Pro Tyr Ala His Phe
1 5 10 15
Thr Gln Ala Val Gly Asn Tyr Glu Leu Lys Thr Ser Glu Gly Thr Ser
20 25 30
Thr His Leu Val Gly Val Lys Asp Asn Gln Gly Glu Val Leu Ala Ala
35 40 45
Cys Leu Leu Thr Ser Val Pro Val Met Lys Lys Phe Asn Tyr Phe Tyr
50 55 60
Ser Asn Arg Gly Pro Val Met Asp Tyr Asp Asn Lys Glu Leu Val Asp
65 70 75 80
Phe Phe Phe Lys Glu Ile Val Ser Tyr Leu Lys Ser Tyr Lys Gly Leu
85 90 95
Phe Phe Arg Ile Asp Pro Tyr Leu Pro Tyr Gln Leu Arg Asp His Asp
100 105 110
Gly Asn Ile Lys Lys Ser Phe Asn Arg Asp Gly Leu Ile Lys Gln Phe
115 120 125
Glu Ser Leu Gly Tyr Glu His Gln Gly Phe Thr Thr Gly Phe His Pro
130 135 140
Ile His Gln Ile Arg Trp His Ser Val Leu Asp Leu Glu Ser Met Asp
145 150 155 160
Glu Lys Thr Leu Ile Lys Asn Met Asp Ser Leu Arg Lys Arg Asn Thr
165 170 175
Lys Lys Val Gln Lys Asn Gly Val Lys Val Arg Phe Leu Ser Lys Asp
180 185 190
Glu Met Pro Ile Phe Arg Gln Phe Met Glu Asp Thr Thr Glu Lys Lys
195 200 205
Asp Phe Asn Asp Arg Gly Asp Asp Phe Tyr Tyr Asn Arg Leu Lys Tyr
210 215 220
Phe Glu Asn Val Lys Ile Pro Leu Ala Tyr Ile Asp Phe Glu Thr Tyr
225 230 235 240
Ile Pro Gln Leu Glu Lys Glu His Glu Gln Tyr Asn Lys Asp Ile Ala
245 250 255
Lys Ala Glu Lys Asp Leu Glu Lys Lys Pro Asp Asn Gln Lys Thr Ile
260 265 270
Asn Lys Ile Asp Asn Leu Lys Gln Gln Arg Glu Ala Asn Glu Ala Lys
275 280 285
Leu Glu Glu Ala Leu Gln Leu Gln Gln Glu His Gly Asp Thr Leu Pro
290 295 300
Ile Ala Ala Gly Phe Phe Ile Ile Asn Pro Phe Glu Val Val Tyr Tyr
305 310 315 320
Ala Gly Gly Ser Ser Asn Glu Tyr Arg His Phe Ala Gly Ser Tyr Ala
325 330 335
Ile Gln Trp Glu Met Ile Lys Tyr Ala Leu Asp His Asn Ile Asp Arg
340 345 350
Tyr Asn Phe Tyr Gly Ile Ser Gly Asp Phe Ser Glu Asp Ala Pro Asp
355 360 365
Val Gly Val Ile Lys Phe Lys Lys Gly Tyr Asn Ala Asp Val Tyr Glu
370 375 380
Tyr Ile Gly Asp Phe Val Lys Pro Ile Asn Lys Pro Ala Tyr Lys Ala
385 390 395 400
Tyr Thr Thr Leu Lys Lys Val Leu Lys Lys
405 410

<210> 52
 <211> 1343
 <212> DNA
 <213> Staphylococcus hominis femA

<220>
 <221> CDS
 <222> (64)...(1317)

<400> 52
 taaaatttta aaattagtca actcaaatta aataaagatt ctaaattagg agttatagag 60
 ata atg aag ttt aca aat tta aca gct aca gaa ttt ggc gat ttt act 108
 Met Lys Phe Thr Asn Leu Thr Ala Thr Glu Phe Gly Asp Phe Thr
 1 5 10 15

gaa aaa atg cca tat agc cat ttt aca cag atg act gaa aat tat gag 156
 Glu Lys Met Pro Tyr Ser His Phe Thr Gln Met Thr Glu Asn Tyr Glu
 20 25 30

tta aaa gtt gct gag aaa act gaa act cat tta gta gga att aaa aat 204
 Leu Lys Val Ala Glu Lys Thr Glu Thr His Leu Val Gly Ile Lys Asn
 35 40 45

aaa gat aat gaa gtc att gct gct tgt atg cta act gct gta ccc gtt 252
 Lys Asp Asn Glu Val Ile Ala Ala Cys Met Leu Thr Ala Val Pro Val
 50 55 60

atg aaa att ttt aaa tat ttt tat tca aat cgt ggt cca gtc att gat 300
 Met Lys Ile Phe Lys Tyr Phe Tyr Ser Asn Arg Gly Pro Val Ile Asp
 65 70 75

tat gaa aac aaa gaa ctc gtt cac ttt ttc ttt aac gaa tta agt aaa 348
 Tyr Glu Asn Lys Glu Leu Val His Phe Phe Phe Asn Glu Leu Ser Lys
 80 85 90 95

tat tta aaa caa caa cat tgt tta tat gta cgt ata gac cct tat ttg 396
 Tyr Leu Lys Gln Gln His Cys Leu Tyr Val Arg Ile Asp Pro Tyr Leu
 100 105 110

cct tat caa tat cgt aat cat gat ggt gat att aca gga aat gct ggg 444
 Pro Tyr Gln Tyr Arg Asn His Asp Gly Asp Ile Thr Gly Asn Ala Gly
 115 120 125

aat gat tgg ttc ttc gat aaa atg aaa caa tta gga tat caa cac gaa 492
 Asn Asp Trp Phe Phe Asp Lys Met Lys Gln Leu Gly Tyr Gln His Glu
 130 135 140

ggg ttt aca aca gga ttt gat cca ata tta caa att cgg ttc cat tca 540
 Gly Phe Thr Thr Gly Phe Asp Pro Ile Leu Gln Ile Arg Phe His Ser
 145 150 155

gtt tta aat tta aag gat aaa act gct aaa gat gta tta aat gga atg 588
 Val Leu Asn Leu Lys Asp Lys Thr Ala Lys Asp Val Leu Asn Gly Met

160	165	170	175	
gat agt tta cga aaa aga aat act aaa aaa gtc caa aaa aat ggt gtt				636
Asp Ser Leu Arg Lys Arg Asn Thr Lys Lys Val Gln Lys Asn Gly Val				
180		185	190	
aaa gta aga ttt ctt act aaa gaa gaa tta cct att ttc aga tca ttt				684
Lys Val Arg Phe Leu Thr Lys Glu Glu Leu Pro Ile Phe Arg Ser Phe				
195		200	205	
atg gaa gat aca tca gag act aaa gaa ttt tct gat aga gag gat agt				732
Met Glu Asp Thr Ser Glu Thr Lys Glu Phe Ser Asp Arg Glu Asp Ser				
210		215	220	
ttt tac tat aat cga ttt gat cat ttt aaa gat aga gta tta gta cct				780
Phe Tyr Tyr Asn Arg Phe Asp His Phe Lys Asp Arg Val Leu Val Pro				
225		230	235	
ctc gca tat ata aaa ttt gat gaa tat ctt gaa gaa ctt cat gca gaa				828
Leu Ala Tyr Ile Lys Phe Asp Glu Tyr Leu Glu Glu Leu His Ala Glu				
240		245	250	255
cgt cag aca tta aat aaa gac tta aac aaa gct cta aaa gat att gaa				876
Arg Gln Thr Leu Asn Lys Asp Leu Asn Lys Ala Leu Lys Asp Ile Glu				
260		265	270	
aaa cga cca gat aac aaa aaa gca caa aat aaa aaa ata aat tta gaa				924
Lys Arg Pro Asp Asn Lys Lys Ala Gln Asn Lys Lys Ile Asn Leu Glu				
275		280	285	
cag caa tta aaa gca aat gag caa aaa att gat gaa gca aca caa ctt				972
Gln Gln Leu Lys Ala Asn Glu Gln Lys Ile Asp Glu Ala Thr Gln Leu				
290		295	300	
caa tta gaa cat ggt aac gaa tta cca ata tct gct gga ttc ttc ttt				1020
Gln Leu Glu His Gly Asn Glu Leu Pro Ile Ser Ala Gly Phe Phe Phe				
305		310	315	
att aat cca ttt gaa gtt gta tat tat gca ggt gga acg tca aat aaa				1068
Ile Asn Pro Phe Glu Val Val Tyr Tyr Ala Gly Gly Thr Ser Asn Lys				
320		325	330	335
tat aga cac ttc gct gga agt tat gca gtt caa tgg act atg att aat				1116
Tyr Arg His Phe Ala Gly Ser Tyr Ala Val Gln Trp Thr Met Ile Asn				
340		345	350	
tat gca att gat cat ggc att gac cgt tat aat ttt tat ggg att agt				1164
Tyr Ala Ile Asp His Gly Ile Asp Arg Tyr Asn Phe Tyr Gly Ile Ser				
355		360	365	
ggt cat ttt aca gat gat gct gaa gat gca ggt gtt gta aaa ttt aaa				1212
Gly His Phe Thr Asp Asp Ala Glu Asp Ala Gly Val Val Lys Phe Lys				
370		375	380	
aaa gga ttt aat gca gat gta att gaa tat gtt ggt gat ttc gtt aaa				1260

Lys Gly Phe Asn Ala Asp Val Ile Glu Tyr Val Gly Asp Phe Val Lys
 385 390 395

cct ata aat aaa cca atg tat tca cta tat aca aca ctt aaa aaa att 1308
 Pro Ile Asn Lys Pro Met Tyr Ser Leu Tyr Thr Thr Leu Lys Lys Ile
 400 405 410 415

aaa aag aga ttgaattaag aggggaatag tgagaa 1343
 Lys Lys Arg

<210> 53
 <211> 418
 <212> PRT
 <213> Staphylococcus hominis femA

D | <400> 53
 Met Lys Phe Thr Asn Leu Thr Ala Thr Glu Phe Gly Asp Phe Thr Glu
 1 5 10 15
 Lys Met Pro Tyr Ser His Phe Thr Gln Met Thr Glu Asn Tyr Glu Leu
 20 25 30
 Lys Val Ala Glu Lys Thr Glu Thr His Leu Val Gly Ile Lys Asn Lys
 35 40 45
 Asp Asn Glu Val Ile Ala Ala Cys Met Leu Thr Ala Val Pro Val Met
 50 55 60
 Lys Ile Phe Lys Tyr Phe Tyr Ser Asn Arg Gly Pro Val Ile Asp Tyr
 65 70 75 80
 Glu Asn Lys Glu Leu Val His Phe Phe Phe Asn Glu Leu Ser Lys Tyr
 85 90 95
 Leu Lys Gln Gln His Cys Leu Tyr Val Arg Ile Asp Pro Tyr Leu Pro
 100 105 110
 Tyr Gln Tyr Arg Asn His Asp Gly Asp Ile Thr Gly Asn Ala Gly Asn
 115 120 125
 Asp Trp Phe Phe Asp Lys Met Lys Gln Leu Gly Tyr Gln His Glu Gly
 130 135 140
 Phe Thr Thr Gly Phe Asp Pro Ile Leu Gln Ile Arg Phe His Ser Val
 145 150 155 160
 Leu Asn Leu Lys Asp Lys Thr Ala Lys Asp Val Leu Asn Gly Met Asp
 165 170 175
 Ser Leu Arg Lys Arg Asn Thr Lys Lys Val Gln Lys Asn Gly Val Lys
 180 185 190
 Val Arg Phe Leu Thr Lys Glu Glu Leu Pro Ile Phe Arg Ser Phe Met
 195 200 205
 Glu Asp Thr Ser Glu Thr Lys Glu Phe Ser Asp Arg Glu Asp Ser Phe
 210 215 220
 Tyr Tyr Asn Arg Phe Asp His Phe Lys Asp Arg Val Leu Val Pro Leu
 225 230 235 240
 Ala Tyr Ile Lys Phe Asp Glu Tyr Leu Glu Glu Leu His Ala Glu Arg
 245 250 255
 Gln Thr Leu Asn Lys Asp Leu Asn Lys Ala Leu Lys Asp Ile Glu Lys
 260 265 270
 Arg Pro Asp Asn Lys Lys Ala Gln Asn Lys Lys Ile Asn Leu Glu Gln
 275 280 285
 Gln Leu Lys Ala Asn Glu Gln Lys Ile Asp Glu Ala Thr Gln Leu Gln

290 295 300
 Leu Glu His Gly Asn Glu Leu Pro Ile Ser Ala Gly Phe Phe Phe Ile
 305 310 315 320
 Asn Pro Phe Glu Val Val Tyr Tyr Ala Gly Gly Thr Ser Asn Lys Tyr
 325 330 335
 Arg His Phe Ala Gly Ser Tyr Ala Val Gln Trp Thr Met Ile Asn Tyr
 340 345 350
 Ala Ile Asp His Gly Ile Asp Arg Tyr Asn Phe Tyr Gly Ile Ser Gly
 355 360 365
 His Phe Thr Asp Asp Ala Glu Asp Ala Gly Val Val Lys Phe Lys Lys
 370 375 380
 Gly Phe Asn Ala Asp Val Ile Glu Tyr Val Gly Asp Phe Val Lys Pro
 385 390 395 400
 Ile Asn Lys Pro Met Tyr Ser Leu Tyr Thr Thr Leu Lys Lys Ile Lys
 405 410 415
 Lys Arg

<210> 54
 <211> 2742
 <212> DNA
 <213> Staphylococcus saprophyticus femA

<220>
 <221> CDS
 <222> (64)...(1326)

<400> 54
 acttgtttag attagaatta aactcgaaaa tagaactata gataaatagg agtatataaa 60
 aaa atg aaa ttt acg aat tta act gca aaa gag ttc ggt gca ttt acg 108
 Met Lys Phe Thr Asn Leu Thr Ala Lys Glu Phe Gly Ala Phe Thr
 1 5 10 15

 gat aaa atg ccg aat agt cat ttt acg caa atg gtt gga aat tat gaa 156
 Asp Lys Met Pro Asn Ser His Phe Thr Gln Met Val Gly Asn Tyr Glu
 20 25 30

 ttg aaa att gca gaa agt aca gaa aca cac cta gta ggt att aag aat 204
 Leu Lys Ile Ala Glu Ser Thr Glu Thr His Leu Val Gly Ile Lys Asn
 35 40 45

 aat gat aat gaa gta att gca gca tgt tta ctt aca gct gtt cct gtt 252
 Asn Asp Asn Glu Val Ile Ala Ala Cys Leu Leu Thr Ala Val Pro Val
 50 55 60

 atg aaa ttc ttc aag tat ttt tat tcc aat aga ggt cca gtc ata gat 300
 Met Lys Phe Phe Lys Tyr Phe Tyr Ser Asn Arg Gly Pro Val Ile Asp
 65 70 75

 ttt gaa aat aaa gaa ctc gta cat tac ttc ttt aac gaa tta gca aaa 348
 Phe Glu Asn Lys Glu Leu Val His Tyr Phe Phe Asn Glu Leu Ala Lys
 80 85 90 95

 tat gta aaa aaa cat aat gcc tta tat tta cga gta gat cct tat ctt 396

Tyr Val Lys Lys His Asn Ala Leu Tyr Leu Arg Val Asp Pro Tyr Leu
 100 105 110

gct tat caa tat cgt aat cat gat ggt gaa gta tta gca aat gcg ggt 444
 Ala Tyr Gln Tyr Arg Asn His Asp Gly Glu Val Leu Ala Asn Ala Gly
 115 120 125

cac gat tgg att ttt gat aaa atg aaa caa ctc ggt tat aag cat gaa 492
 His Asp Trp Ile Phe Asp Lys Met Lys Gln Leu Gly Tyr Lys His Glu
 130 135 140

ggt ttt tta act ggc ttt gac cca ata ctt caa ata aga ttc cat tct 540
 Gly Phe Leu Thr Gly Phe Asp Pro Ile Leu Gln Ile Arg Phe His Ser
 145 150 155

gtt tta gat tta gct gga aaa act gct aaa gac gta ctt aat ggt atg 588
 Val Leu Asp Leu Ala Gly Lys Thr Ala Lys Asp Val Leu Asn Gly Met
 160 165 170 175

gat agt tta cgt aaa cga aat act aaa aaa gta cag aaa aat ggt gtg 636
 Asp Ser Leu Arg Lys Arg Asn Thr Lys Lys Val Gln Lys Asn Gly Val
 180 185 190

D1
 aaa gta aga ttt tta ggt gaa gat gag ttg cca ata ttc cgc tca ttc 684
 Lys Val Arg Phe Leu Gly Glu Asp Glu Leu Pro Ile Phe Arg Ser Phe
 195 200 205

atg gaa gat act tct gaa aca aag gat ttt gac gat aga gat gac gat 732
 Met Glu Asp Thr Ser Glu Thr Lys Asp Phe Asp Asp Arg Asp Asp Asp
 210 215 220

ttt tat tat aat agg tta aga tat tat aaa gat cgt gtg ctt gtc cca 780
 Phe Tyr Tyr Asn Arg Leu Arg Tyr Tyr Lys Asp Arg Val Leu Val Pro
 225 230 235

tta gct tat atg gat ttt gat gaa tat ata aca gaa tta aag gct gaa 828
 Leu Ala Tyr Met Asp Phe Asp Glu Tyr Ile Thr Glu Leu Lys Ala Glu
 240 245 250 255

cgc gaa gta tta agt aaa gat ata aat aaa gca gtt aag gat ata gaa 876
 Arg Glu Val Leu Ser Lys Asp Ile Asn Lys Ala Val Lys Asp Ile Glu
 260 265 270

aaa aga cca gaa aat aaa aaa gcg tat aat aaa aaa gaa aat tta gaa 924
 Lys Arg Pro Glu Asn Lys Lys Ala Tyr Asn Lys Lys Glu Asn Leu Glu
 275 280 285

caa caa ctg att gca aac caa caa aaa ata gat gaa gcc act gcg tta 972
 Gln Gln Leu Ile Ala Asn Gln Lys Lys Ile Asp Glu Ala Thr Ala Leu
 290 295 300

caa gag aag cat ggt aac gaa tta ccg att tct gca gct tac ttt att 1020
 Gln Glu Lys His Gly Asn Glu Leu Pro Ile Ser Ala Ala Tyr Phe Ile
 305 310 315

att aat cct tat gaa gtc gtt tac tat gca ggt ggt aca tct aat gaa 1068
 Ile Asn Pro Tyr Glu Val Val Tyr Tyr Ala Gly Gly Thr Ser Asn Glu
 320 325 330 335

ttt aga cat ttt gct ggt agt tat gca ata caa tgg aag atg att aat 1116
 Phe Arg His Phe Ala Gly Ser Tyr Ala Ile Gln Trp Lys Met Ile Asn
 340 345 350

tat gct ata gat cat aat ata gat aga tat aat ttt tat ggt att agt 1164
 Tyr Ala Ile Asp His Asn Ile Asp Arg Tyr Asn Phe Tyr Gly Ile Ser
 355 360 365

ggt cat ttt act gaa gat gca gaa gat gca ggt gtt gtt aaa ttt aaa 1212
 Gly His Phe Thr Glu Asp Ala Glu Asp Ala Gly Val Val Lys Phe Lys
 370 375 380

aaa ggt ttt aat gca gat gta gta gaa tat gtt ggt gat ttt att aaa 1260
 Lys Gly Phe Asn Ala Asp Val Val Glu Tyr Val Gly Asp Phe Ile Lys
 385 390 395

ccg att aat aag cca atg tac aaa att tat acg aca ttg aaa aaa att 1308
 Pro Ile Asn Lys Pro Met Tyr Lys Ile Tyr Thr Thr Leu Lys Lys Ile
 400 405 410 415

aag gat aaa aag aaa taa acataaatag aagggaacta agctagaatg 1356
 Lys Asp Lys Lys Lys *
 420

aaatttacag agttaacttg tttagattag aattaaactc gaaaatagaa ctatagataa 1416
 ataggagtat ataaaaaaat gaaatttacg aatttaactg caaaagagtt cgggtgcattt 1476
 acggataaaa tgccgaatag tcatttttacg caaatggttg gaaattatga attgaaaatt 1536
 gcagaaaagta cagaaacaca cctagtaggt attaagaata atgataatga agtaattgca 1596
 gcatgtttac ttacagctgt tcctgttatg aaattcttca agtattttta ttccaataga 1656
 ggtccagtc tagattttga aaataaagaa ctctgacatt acttctttaa cgaattagca 1716
 aaatatgtaa aaaaacataa tgccttatat ttacgagtag atccttatct tgcttatcaa 1776
 tatcgtaatc atgatggtga agtattagca aatgcgggtc acgattggat ttttgataaa 1836
 atgaaacaac tcggttataa gcatgaagggt tttttaactg gctttgaccc aatacttcaa 1896
 ataagattcc attctgtttt agatttagct ggaaaaactg cttaaagacgt acttaatggt 1956
 atggatagtt tacgtaaacg aaatactaaa aaagtacaga aaaatggtgt gaaagtaaga 2016
 ttttttaggtg aagatgagtt gccaatattc cgctcattca tggaagatac ttctgaaaca 2076
 aaggattttg acgatagaga tgacgatttt tattataata ggttaagata ttataaagat 2136
 cgtgtgcttg tcccattagc ttatatggat tttgatgaat atataacaga attaaaggct 2196
 gaacgcgaag tattaagtaa agatataaat aaagcagtta aggatataga aaaaagacca 2256
 gaaaataaaa aagcgtataa taaaaaagaa aatttagaac aacaactgat tgcaaaccaa 2316
 caaaaaatag atgaagccac tgcgttacaa gagaagcatg gtaacgaatt accgatttct 2376
 gcagcttact ttattattaa tccttatgaa gtcggttact atgcaggtgg tacatctaata 2436
 gaatttagac attttgctgg tagttatgca atacaatgga agatgattaa ttatgctata 2496
 gatcataata tagatagata taatttttat ggtattagtg gtcattttac tgaagatgca 2556
 gaagatgcag gtgttggttaa atttaaaaaa ggttttaaat cagatgtagt agaatatgtt 2616
 ggtgatttta ttaaaccgat taataagcca atgtacaaaa tttatacgac attgaaaaaa 2676
 attaaggata aaaagaaata aacataaata gaagggaact aagctagaat gaaatttaca 2736
 gagtta 2742

<210> 55

<211> 420

<212> PRT

<213> Staphylococcus saprophyticus femA

<400> 55

Met Lys Phe Thr Asn Leu Thr Ala Lys Glu Phe Gly Ala Phe Thr Asp
1 5 10 15
Lys Met Pro Asn Ser His Phe Thr Gln Met Val Gly Asn Tyr Glu Leu
20 25 30
Lys Ile Ala Glu Ser Thr Glu Thr His Leu Val Gly Ile Lys Asn Asn
35 40 45
Asp Asn Glu Val Ile Ala Ala Cys Leu Leu Thr Ala Val Pro Val Met
50 55 60
Lys Phe Phe Lys Tyr Phe Tyr Ser Asn Arg Gly Pro Val Ile Asp Phe
65 70 75 80
Glu Asn Lys Glu Leu Val His Tyr Phe Phe Asn Glu Leu Ala Lys Tyr
85 90 95
Val Lys Lys His Asn Ala Leu Tyr Leu Arg Val Asp Pro Tyr Leu Ala
100 105 110
Tyr Gln Tyr Arg Asn His Asp Gly Glu Val Leu Ala Asn Ala Gly His
115 120 125
Asp Trp Ile Phe Asp Lys Met Lys Gln Leu Gly Tyr Lys His Glu Gly
130 135 140
Phe Leu Thr Gly Phe Asp Pro Ile Leu Gln Ile Arg Phe His Ser Val
145 150 155 160
Leu Asp Leu Ala Gly Lys Thr Ala Lys Asp Val Leu Asn Gly Met Asp
165 170 175
Ser Leu Arg Lys Arg Asn Thr Lys Lys Val Gln Lys Asn Gly Val Lys
180 185 190
Val Arg Phe Leu Gly Glu Asp Glu Leu Pro Ile Phe Arg Ser Phe Met
195 200 205
Glu Asp Thr Ser Glu Thr Lys Asp Phe Asp Asp Arg Asp Asp Asp Phe
210 215 220
Tyr Tyr Asn Arg Leu Arg Tyr Tyr Lys Asp Arg Val Leu Val Pro Leu
225 230 235 240
Ala Tyr Met Asp Phe Asp Glu Tyr Ile Thr Glu Leu Lys Ala Glu Arg
245 250 255
Glu Val Leu Ser Lys Asp Ile Asn Lys Ala Val Lys Asp Ile Glu Lys
260 265 270
Arg Pro Glu Asn Lys Lys Ala Tyr Asn Lys Lys Glu Asn Leu Glu Gln
275 280 285
Gln Leu Ile Ala Asn Gln Gln Lys Ile Asp Glu Ala Thr Ala Leu Gln
290 295 300
Glu Lys His Gly Asn Glu Leu Pro Ile Ser Ala Ala Tyr Phe Ile Ile
305 310 315 320
Asn Pro Tyr Glu Val Val Tyr Tyr Ala Gly Gly Thr Ser Asn Glu Phe
325 330 335
Arg His Phe Ala Gly Ser Tyr Ala Ile Gln Trp Lys Met Ile Asn Tyr
340 345 350
Ala Ile Asp His Asn Ile Asp Arg Tyr Asn Phe Tyr Gly Ile Ser Gly
355 360 365
His Phe Thr Glu Asp Ala Glu Asp Ala Gly Val Val Lys Phe Lys Lys
370 375 380
Gly Phe Asn Ala Asp Val Val Glu Tyr Val Gly Asp Phe Ile Lys Pro
385 390 395 400
Ile Asn Lys Pro Met Tyr Lys Ile Tyr Thr Thr Leu Lys Lys Ile Lys

405

410

415

Asp Lys Lys Lys
420

<210> 56
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<221> misc_feature
<222> (0)...(0)
<223> M= A or C

<400> 56
ttcmaatcgc ggtccagt

18

<210> 57
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 57
caagaacatg gcaacgaatt acc

23

<210> 58
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 58
tgggtaattc gttgcatgt tct

23

<210> 59
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 59
ccaagcatct tcagcatctt c

21

<210> 60
<211> 29

<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 60
ttctttaact gttaactctg taaatttca

29

<210> 61
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 61
acatattttac ttaattcggt aaagaa

26

<210> 62
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 62
cagaaaaatg gtgttaaagt aagattt

27

<210> 63
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 63
aagaaatctt actttcacac cattttt

27

<210> 64
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 64
aactcgaaaa tagaacta

18